Developing Adaptation Responses

ADAPTING TO RISING TIDES PROGRAM

This guide helps with …

Developing draft adaptation responses for asset-specific vulnerabilities and key planning issues that lay a clear and transparent path towards implementation.

Definitions: Parts of an adaptation response

An adaptation response consists of (1) a vulnerability or planning issue, (2) one or more adaptation actions to address the vulnerability(s) underlying this issue, and (3) implementation options with information about partners and processes for implementing the actions. Developing fleshed out adaptation responses is time intensive – much more so than merely listing adaptation actions or strategies – however, the packaged information in a response offers several benefits by helping to:

- Connect actions to the assessment findings (i.e. the vulnerabilities)
- Present a number of possible stand-alone or sequenced actions
- Characterize actions by type, priority, and implementation scale
- Identify possible implementation partners and processes
- Provide greater transparency to project decision-making overall

The Vulnerability or Planning Issue

A project that has followed the ART approach should have, at this stage, clearly defined the:

- Vulnerabilities and consequences on profile sheets for the assets addressed

  At the ART Portfolio website, refer to: Define Your Project > Step 4. Summarize Findings; and **How-to Guides: Vulnerability and Consequence Statements** () and **Profile Sheets** ()
- Planning issues for the project

  At the ART Portfolio website, refer to: Define Your Project > Step 5. Identify Issues; and **How-to-Guides: Issue Statements** () and **Key Planning Issues** ()

The ART Program often groups vulnerabilities according to a few characteristics, or classifcations, that can help in identifying adaptation actions. These classifications are noted for the vulnerabilities in the **ART Subregional Adaptation Responses** () and the **Oakland/Alameda Resilience Study Example Profile Sheets** ():

Information (INFO) – Challenges in obtaining information necessary to understand or resolve issues

Governance (GOV) – Challenges with management, regulatory authority or funding options that create barriers to adaptation

Physical (PHYS) – Conditions or design aspects of an asset that make it very sensitive to impacts

Functional (FXN) – Aspects of an asset's function, relationships and/or dependencies on other assets that limit its adaptive capacity

Planning issues – whether they are asset-specific, or key planning issues for the entire project – usually result from multiple, interdependent vulnerabilities. Ideally, these vulnerabilities are identified or referenced in the issue statement to make clear the causes of the issue that need to be addressed with adaptation actions.

Adaptation Actions

Adaptation responses almost always include multiple *actions* that together address, or make progress towards addressing a vulnerability or issue. In researching responses the project team should look for a variety of actions, and consider the role each action has in a response.

An Example Adaptation Response

VULNERABILITY (FXN)

Hegenberger Road is a City of Oakland Evacuation Route. It cannot serve the function of safely evacuating people if it is not operational due to a flooding or seismic event.

ADAPTATION ACTION 1

Conduct a "hot spot" analysis to identify key routes and nodes critical to traffic flow, assess their vulnerability and risk, and develop actions to improve their resilience to sea level rise and storm events.

- **Action Type**: Evaluation
- **Characterization**: Do It Yourself, Unlocking, Multi-Benefit, Local & Regional
- **Processes**: Long-Range Planning, Operations, Emergency & Hazards Planning, New Initiative
- **Agencies & Organizations Involved**: ABAG, MTC, Caltrans, etc

ADAPTATION ACTION 2

Increase the capacity to accommodate re-routed traffic on alternative routes, or build new routes, in areas not at risk from sea level rise and storm events.

- **Action Type**: Program/ Operation.
- **Characterization**: Long Lead-Time, Local & Regional
- **Processes**: Long-Range Planning, Capital Planning
- **Agencies & Organizations Involved**: MTC, Caltrans, AC Transit, etc

Action Type

Types[1] of actions identified in the ART Program include:

Evaluation – actions to improve data and information or conduct new analyses

Program/Operation – actions to update plans, procedures or management activities

Policy development – actions to develop or revise policies and guidelines

Coordination – actions to initiate or expand partnerships

Education/outreach – actions to communicate information and build awareness

Action Characterization

Actions can have various roles in a response, such as unlocking, or making possible, future actions; conferring multiple benefits; allowing for independent action by an individual agency or asset manager; or requiring a long lead time for implementation (meaning that they should be initiated early). The characterizations identified by the ART Program are summarized in the following table.

Action Characterization	Description
Unlocking	Actions that can enable other actions. Some unlocking actions contribute independently to resilience, while others serve primarily as stepping stones to other actions. Unlocking actions are generally high priority for implementation as they are often the foundation on which many other actions depend. However, depending on the vulnerability the action addresses and the potential magnitude of the consequences, not all unlocking actions will be taken first as other actions may be higher priority or provide multiple benefits and therefore would be easier to gain support and funding for.
Do it Yourself (DIY)	Actions that an asset owner or operator could take on independently without the formation of new partnerships or collaborations. DIY does not imply a 'go it alone' approach, as owners and operator will need to comply with existing regulations and it may be beneficial to seek participation from other entities. DIY does indicate the actions that can be taken without changes to existing regulations, possibly using existing funding streams or operational processes such as regular maintenance or upgrades tied to asset lifecycle
Multi-benefit	Actions that will improve asset performance or provide community benefits beyond improving the resilience to climate change. These benefits may including addressing other hazards such as earthquakes, improving the local quality of life, for example through new recreational opportunities, or encouraging the local economy. Investments in actions that provide multiple benefits that in near term can improve sustainability and help to address existing challenges.
Long Lead Time	Actions that should be implemented early as they generally require the coordination of many partners, will result in formal agreements, joint planning or funding decisions,

[1] These types were originally adapted from the Association of Bay Area Government's (ABAG) Regional Resilience Initiative Action Plan, available at resilience.abag.ca.gov.

	require difficult decision making or are controversial, include a number of different assets, or require collaborative regional planning or research.
Scale	Indicates the geographic scale at which an action could be carried out. Local actions are those that would be taken at the city or county level; regional actions across the entire nine county Bay Area by the agencies, organizations or entities that operate at this scale; state actions by state agencies or state-wide organizations or entities; or at the federal level by national agencies or partners

Implementation Options

Adaptation responses include implementation options that highlight the agencies, organizations and individuals (actors) that should be involved and the processes into which the actions could be integrated.

Agencies, Organizations and Individuals

These "actors" include those that are likely to lead action implementation (often asset owners or operators), as well as potential decision-making or funding partners, regulatory or permitting agencies, non-profit and community organizations, the private sector, landowners, and the owners and operators of adjacent properties or interconnected infrastructure.

Often, not all of those identified will either choose or need to be engaged in implementation. In some cases, it will be necessary to seek a broad range of participation from all levels of governance – from the private sector, to community organizations, to surrounding neighborhoods, organizations and agencies, as well as others with adjacent or interconnected assets.

Processes

In an adaptation response, ART Program identifies the possible planning mechanisms, governance structures or collaborative approaches that could be used to implement adaptation actions. The processes in the table below reflect common mechanisms, structures and approaches used by agencies, organizations and stakeholders that have participated in ART Program projects. The "new initiative" category indicates the possible need for changes to existing laws and policies, other organizational shifts, or a need for new funding sources.

Capital Planning	Project Planning and Design
Capital improvement plans Caltrans Project in Development (PID)	Private and public development projects Restoration project planning and permits
Codes and Standards	**Long-Range Planning**
Building codes and standards City ordinances Construction codes Design standards State and federal standards	Agency or facility master plan Climate Action Plan Community-based planning Regional Airport Sustainability Plan (RASP) Regional Transportation Plan (RTP)

Other standards, e.g., professional organizations or committees	Sustainable Communities Strategy (SCC) Integrated Water Resource Management Plan (IRWMP)
Emergency and Hazard Planning	**Land-Use Planning**
State or local hazard mitigation plans Emergency response and recovery plans Standardized Emergency Management Systems (SEMS) National Incident Management System	General plan Specific plan Land use plan
Operations	**New Initiatives**
Annual budgeting Continuity of Operations Plans (COOP) State Highway Operation and Protection Program (SHOPP)	Partnerships and collaborations Ballot measures Legislation

Developing Adaptation Responses

1. Review the key planning issues and asset-specific vulnerabilities identified from the assessment.
2. Review and research adaptation responses, strategies, actions, and implementation options that have been developed by others for similar assets, sectors or services.
3. Develop (draft) responses for asset-specific vulnerabilities.
4. Engage the working group on key planning issues.
5. Develop draft adaptation responses for the key planning issues.

1. Review key planning issues and asset-specific vulnerabilities

Before developing adaptation actions and strategies, the project team should be very familiar with the findings of the assessment. This is a separate step here because a planning effort (of any type) can easily lose sight of some of the issues – the problems – that were identified in scoping and assessment as the project shifts to developing policies and action planning. As a result, issues that should have been considered and addressed can be overlooked or worse, exacerbated, by the responses developed in the project.

2. Research and review existing examples

Conduct research on the adaptation responses, strategies, actions, and implementation options that have been developed by others for similar assets, sectors or services. Review the ART Program's adaptation

responses (**ART Subregional Adaptation Responses** (and **.xls**) and the **Oakland/Alameda Resilience Study Example Profile Sheets** ( ), local planning documents such as general plans, emergency response plans, and local hazard mitigation plans. Consider actions and policies developed after past disruptions or hazard events to generate ideas about how best to respond to the identified vulnerabilities and planning issues.

Contact working group members individually, or local and national topic experts, and ask for their best professional judgment on the actions and implementation options that will be the most practical, feasible, and responsive to the issues identified.

3. Develop draft responses for asset-specific vulnerabilities

For the asset-specific vulnerabilities on the profile sheets (i.e., those not captured in the key planning issues), add adaptation responses. As much as possible, take these from existing resources, such as the **ART Subregional Adaptation Responses** ( ).

Review the **Oakland/Alameda Resilience Study Example Profile Sheets** ( ) to see how the ART team has used the adaptation responses from the ART Subregional Project to streamline this task for other projects. For each of the actions on these example profile sheets, the ART team has noted if the action was taken as is, or modified from a subregional response, or if it is new. To make it easier to copy subregional responses to your profile sheets, they are available in a spreadsheet format as well: **ART Subregional Adaptation Response Spreadsheet.xls**.

Personalize the responses!

Using adaptation actions and strategies developed by other sources can save the project team a tremendous amount of work, but most often, these cannot be used verbatim.

The project team should revise the language of each action to be specific to the asset-specific vulnerability or planning issue that it is intended to address, and add information about the action type, characterization and implementation options.

This can be quite a bit of work, but the revision process will help the project team build better responses with feasible and effective actions. And, the "personalized" information will help working group members and other stakeholders understand and provide specific feedback on the actions and responses.

4. Engage the working group on key planning issues

Determine an approach for engaging the working group in developing adaptation responses to the key planning issues that will make the most efficient use of their time by engaging them on the issues relevant to them.

One approach is to divide up the planning issues based on who from the working group should be involved. Ideally this will allow the project team to schedule smaller, focused meetings with subsets of working group members, providing a better venue for problem-solving collaboratively and creatively.

If planning issues relate to a specific geographic area or asset, consider leading a field visit to the relevant

sites in the project area to help everyone gain a better understanding of the underlying vulnerabilities and relationships. This can be followed by a group brainstorm and discussion of responses to the issue. **Engagement Exercise: Field Trip** (📄)

To help participants engage more openly and collaboratively in these meetings, avoid getting too specific with responsibilities for implementation of adaptation responses. Particularly at this stage in the project, some stakeholders will be reluctant to participate if they feel that they are being assigned tasks or asked to make a commitment of future resources.

While it is important to share all key planning issues for the project with the working group, avoid spending much time on an issue that is beyond the scope of their interests and authority (e.g., lack of information for understanding groundwater rise and salinity intrusion).

Similarly, if an important stakeholder for an issue cannot be part of the discussion of adaptation responses, it is best to postpone a meeting until they can be engaged, or table the issue for the time-being if the stakeholder is reluctant to participate.

5. Develop adaptation responses for the key planning issues

Develop draft adaptation responses for the key planning issues based on the discussion(s) and input provided from the focused meetings and site visits.

In the ART Program the organization and format of these responses has varied significantly from project to project because of the issues themselves, the working group members involved, and their input. Three examples are described here: high-level concepts for an entire project area; phased responses; and issue-themed actions.

High-level concepts:

In the Hayward Shoreline Resilience Project, ART Program staff gathered ideas and feedback during field trips and discussions with working group members about the five key planning issues. This helped staff develop three, draft conceptual landscape visions for the study area. **Projects > Local > Hayward Shoreline Resilience Study: Report** (📄) These visions incorporated coordinated and multi-objective responses intended to achieve different balances of grey and green infrastructure given the physical setting of the study area and surrounding land uses. At the next meeting, the staff engaged the working group members in visualizing these alternative visions (or future scenarios) for the project area. They were asked to consider key services and functions within and outside of the project area would be maintained, changed or lost over time depending on the different types, combinations, and sequences of physical adaptation actions implemented across the project area. Input from this exercise enabled staff to further flesh out adaptation responses for each of the landscape visions.

Phased responses:

In order to fully understand the key planning issues for the ART Oakland/Alameda Resilience Study as they fit onto the landscape, and to develop appropriate multi-sector, multi-objective adaptation responses, ART Program staff divided the study area into two geographies. **Projects > Local > Oakland/Alameda Resilience Study** For both of these areas, staff organized field trips and tabletop planning exercises to help the working group wrestle with interrelated vulnerabilities and strategies in

these geographies. This prompted working group members to consider and develop a better understanding of one another's priorities and constraints, and to thinking about what they could do within and across their jurisdictions to address current and future flood risk. Over the next few months, ART Program staff and working group members refined adaptation responses and developed appropriate packages of phased adaptation responses. This approach allowed them to focus on the suite of (related) near-term challenges (resulting from current conditions to three feet of sea level rise) that require coordinated responses. In the longer-term, sea level rise crosses certain thresholds for this study area, presenting an additional suite of challenges. The ART Program staff did not want the working group to lose sight of these future challenges, but also recognized that they require different types of (future) resilience planning for the area, that will depend heavily on responses to near-term issues.

Issue-themed actions:

The Alameda County (ART Subregional) Project was conducted for a much broader planning area than the previous two examples, and, as such, resulted in very different approach to developing adaptation responses for the key issues. To engage the working group in identification and developing responses to key planning issues, the ART Program staff used the **Engagement Exercise: Adaptation Response Open House** () in two ways. Staff shared and got input on the draft responses for the vulnerabilities, and this as an opportunity to initiate a follow-up discussion with the working group (as a whole) to explore key planning issues and responses. ART Program staff then reached out to individual working group members to get further feedback and clarification on issues and potential responses identified in the meeting. From this, staff developed narrative summaries of five issue themes that included descriptions of fundamental actions that would be part of adaptation responses to these issues. **Projects > Local > Alameda County (ART Subregional) Project > Developing an Adaptation Response: The Plan Step** () Although this approach did not result it detailed adaptation responses, the summaries, which were appropriate to the scope and scale of the project, served as indicators of the most pressing actions needed to address the challenges that the subregion faces as the Bay rises. Notably, the recommended actions prompted additional focused planning efforts among working group members to further flesh out issues and adaptation responses.

Regardless of the way the project staff chooses to tackle this step, it is critical to follow up with stakeholders individually about the draft responses for the key planning issues to get their input on the direction that these are taking, as well as their help in fleshing out possible actions and roles in implementation that could be appropriate for their agencies and organizations.